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ABSTRACTS

from

TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noticed)

Biochemical Studies on "Sotetsu" (Cycar revoluta Thunb.). Part IX.

On the chemical constituent of the outer spermoderm of "Sotetsu"-seed.

(pp. 505～506)

By Kotaro NISHIDA.

(Kagoshima Agricultural College, Received Apr. 7, 1938.)

An Improved Method to Determine the Digestibility of Protein in Fish Meal.

(pp. 507～511)

By Kokichi OSHIMA and Shinichi ITAYA.

(From the Chemical Laboratory of the Hakodate College of Fisheries, Japan, Received Apr. 10, 1938.)

The authors published in 1934 a new method to determine the digestibility of protein in fish meal, which is now improved as follows:—

In an Erlenmeyer's flask of 300 cc capacity mix 2 g fish meal, from which the oil has been extracted and which has been passed through a 0.5 mm sieve, 100 cc of 0.2 *N* HCl and 100 cc of 1.0% pepsin made by Parke, Davis and Co. in U. S. A., and close it with a cork.

The flask is kept in an incubator of 37～38°C for 44 hours with occational (five times are enough) shakings.

After the digestion, the content is filtered through a filter paper, washed with hot water and the residue is analyzed for its total nitrogen by Kjeldahl's method.

The nitrogen of pure protein in the original fish meal (oil extracted) is also determined by Barnstein's method.

$$\text{The digestibility of the pure protein} = \frac{\text{Pure protein N} - \text{Residue N}}{\text{Pure protein N}} \times 100 .$$

The Relation of the Qualities and the Manufacturing Method of Fish Meal and Scrap.

(pp. 512～517)

By Kokichi Oshima and Shinichi Itaya.

(From the Chemical Laboratory of the Hakodate College of Fisheries, Japan,
Received Apr. 10, 1938.)

The following samples were analyzed for their protein digestibiblity, ether extract, benzol extract, ammonia, total nitrogen, and hydrogen ion concentration of the water extract.

Method of manufacture	Raw material		Localities	
	Sardine	Other fishes	Foreign	Domestic
Sun dried (cooked)	7	—	—	7
Steam dried	8	5	5	8
Flame dried	4	2	6	—
Vacuum dried	2	—	2	—
Roasted	3	—	—	3

1. The steam dried meals have the best digestibility of the protein; the sun dried and vacuum dried meals the second, while the flame dried and the roasted meals have the least.

2. The ammonia content in the sundried meals is generally much higher than that in those made by machine.

Among the sun dried scraps the ammonia content conforms strictly in proportion to the grade of scraps, as classified by the official inspector.

3. The nitrogen content depends not on the method of manufacture, but on the kind of fishes used.

4. The hydrogen ion concentration of the water extract of fish meals shows no relation to the ammonium content, but has certain bearings to the kind of fishes used.

5. In regard to the centents of ammonia, total nitrogen, and the digestibility of protein in the sardine meals, made by machine, these produced in foreign countries are slightly better than those in the domestic products.

On the Oxidation and its Prevention of Vitamin A in Oils.

(pp. 518～524)

By Y. Masuda.

(Agr. Chemical Laboratory, Hokkaido Imp. Univ., Received Mar. 31, 1938.)

Studies on the Action of Arginase on Canavanin and Arginine I.

The Identification of Canavanase and Arginase.

(pp. 525～531)

By Matsunosuke KITAGAWA and Yukio EGUCHI.
(Biochemical Laboratory, Department of Agriculture, Kyushu Imperial University, Fukuoka,
Received Apr. 8, 1938.)

Canavanin is hydrolysed into urea and canalin by a liver ferment, which was suggested to be a new ferment in the previous paper for the reason of the strict specificity of arginase and the characteristic structure of canavanin.

In this study, canavanase was known to be identical with arginase, considering the constancy of the ratio of activity of the two ferments in every case.

Ueber die Fabrikation des Alkohols aus rohen Bataten.

Fortgesetzte Mitteilung

(ss. 532～541)

Von M. NAKANO, K. KOBAYASHI, und TAKESITA.
(The Department of Industry, Goverment Reserch Institute, Taiwan, Japan,
Received Apr. 11, 1938.)

Feeding Experiments with Decomposition Products of Proteins. (VIII).

Can Norleucine replace Lesyne in the Diet?

(pp. 542～544)

By Siro MAEDA.
(The Institute of Physical and Chemical Reserch,
Received May. 28, 1937.)

On the Alcohol-Manufacture from Jerusalem Artichoke (Part IV).

Alcoholic Fermentation of Jerusalem Artichoke.

(pp. 545～564)

By Toshinobu ASAI.
(Agricultural Chemical Laboratory, Morioka Agricultural College, Japan,
Received March 9, 1938.)

Researches on "Tundrite". Part I.

Warping of artificial lumbers.

(pp. 565～572)

By Saisuke HUZII.
(Kyoto Imperial University, Received Mar. 17, 1938.)

"Tundrite" is the commercial name of the artificial lumber (tex) made from the Tundra peat of Karahutô. The warping of several kinds of artificial lumbers and the methods to avoid such defects were studied and discussed.

Ueber die Gärungsmikroorganismen in Awamori-Bereitung (III).

Am wohlgeschmack teilnehmende Mikroorganismen und gemischte Vergärung.

(ss. 573～589)

Von R. NAKAZAWA und M. SIMO.

(The Department of Industry, Government Reserch Institute, Taiwan, Japan,

Received Apr. 11, 1938.)

Oryzanin, "Antineuritic Vitamin."

VII. On the Activity of the Crystalline Vitamin B_1 and the International Standard.

(pp. 590～598)

By Sator OHDAKE and Teikichi YAMAGISHI.

(Agricutural Chemical Laboratory, Faculty of Agriculture, Imperial University of Tokyo.

Recieved March 27, 1938.)

At the Second International Conference on Vitamin Standardisation,(1) held in London in 1934, it has been proposed to compare the potency of the crystalline vitamin B_1 preparation with the Standard Adsorption Product with the aim of ultimately adopting the pure crystalline vitamin B_1 as the International Standard. A number of results concerning it have already been reported :—

Table 1. Activity of the crystalline vitamin B_1.

Authors	B_1 crystals, equivalent to the International standard unit.	Methods.
Ohdake & Yamagishi(2)	0.0015 mg	Rat growth & pigeon day-dose
Waterman & Ammerman(3)	0.005 mg	Rat growth test
Kinnersley & Peters(4)	0.002 mg	Pigeon day-dose & catatorulin test
Jansen(5)	0.003 mg	Rat curative test
Leong & Harris(6)	0.0029 mg (Natural) 0.0028 mg (Synthetic)	Bradycardia

(1) League of Nations, Health Organisation (1934). Report of the Permanent Commission of Biological Standardisation (Geneva).

(2) Ohdake & Yamagishi :- Bull. Agr. Chem. Soc. Japan, **11**, 5 (1935). Ibid. **11**, 111 (1935).

(3) Watermann & Ammerman :- J. Nutrition, **10**, 35 (1935).

(4) Kinnersley & Peters :- Biochem. J. **30**, 985 (1936).

(5) Jansen :- Z. Vitamin Forsch. **5**, 254 (1936).

(6) Leong & Harris :- Biochem. J. **29**, 672 (1937).

During the past few years, however, the chemical study on vitamin B_1 made a rapid progress and at last the synthetical process for the production of the pure vitamin B_1 was discovered. The National Institute of Medical Research, London, acting as the central laboratory of the Conference, obtained a sufficient quantity of the pure synthetic B_1 preparation from four different laboratories—I. G. Farbenindustrie Aktiengesellschaft., Merck & Co. Inc., E. Merck, and Hoffmann-la Roche & Co. — and proposed to compare its biological activity with the existing standard adsorption product for the purpose of adopting the synthetic crystalline product as the international standard.

In the present communication, four kinds of materials—(1) the International Standard Adsorption Product, (2) the synthetic vitamin B_1 crystals, the proposed new standard (3) Oryzanin crystals, the natural vitamin B_1 crystals isolated from rice polishings in this laboratory and (4) "Injectio Oryzanin Fortior, Decemplex" of Sankyo & Co., the commercial B_1 preparation containing 0.5 mg of the crystalline B_1 hydrochloride in 1 c.c.—were studied as to their B_1 activities by the three known methods—(A) rat growth (B) pigeons day dose and (C) pigeons curative tests, — and the results were compared with the international standard.

Experimental.

(A) Rat growth test.

When young albino rats of about 40 g body weight were fed on the standard artificial diet, free from B_1, consisting of 60% of purified starch, 20% of purified casein, 15% arachis oil and 5% of McCollums salt mixture No 185, supplemented daily with three drops of cod liver oil and 0.4 g of autoclaved yeast, the body weight declined after a week (preliminary feeding) and the animals developed severe symptoms of B_1 deficiency usually in 4–5 weeks. (Control rats. Chart. 1)

(1) The Standard Adsorption Product :– Young rats, showing declining growth on the above artificial diet for a week, when supplemented daily with 5 mg of the adsorption product, they recovered and remained healthy during 5 weeks though the supplement was still insufficient for maintaining the normal growth. By supplementing daily with 10 mg, rats maintained the normal growth, gaining 8.8 g per week in average for 5 weeks. When supplemented daily with 15 mg, the growth rate was still better. (Table 2. Chart 1.) The standard growth rate in the present experiment was observed to be 8–9 g per week in average. The comparatively poor rate is due to the temperature of the animal room which could not be maintained above 17~24°C through the extremely cold winter, when the experiment was conducted.

(2) The synthetic B_1 crystals :– Rats fed on the same artificial diet, supplemented daily with 0.001 mg of the synthetic B_1 crystals, were perfectly healthy during 5 weeks and as to the effect on the growth rate, this amount was comparable with 5 mg of the adsorption product, and also with 0.001 mg of oryzanin crystals. With a daily dose of 0.002 mg, young rats maintained the standard

growth, gaining about 8.3 g per week in average for 5 weeks. (Table 2. Chart. 2)

(3) Oryzanin crystals:– When supplemented daily with 0.001 mg of the natural B_1 crystals isolated from rice polishings, rats showed nearly the same growth rate as with 5 mg of the adsorption product. By giving daily 0.002 mg, they maintained the standard growth, gaining about 8.8 g per week in average for 5 weeks and result was comparable with that produced by 10 mg of the adsorption product or by 0.002 mg of the synthetic product. (Table 2. Chart. 3.) Thus we see that the synthetic B_1 crystals has nearly the same activity as the natural B_1 and 0.002 mg of both are approximately equivalent to the standard unit.

(4) The commercial "Injectio Oryzanin Fortior":– It gave also the same result, 0.004 cc (=0.002 mg of the crystals) being required for the standard unit.

Table 2. Comparison of B_1 activity by the rat growth test;

Materials	Dose (mg)	Number of rats	Growth Rate (per week)		
			Average 5 weeks (g)	First week (g)	Fifth week (g)
(1) The Standard Adsorption product	5.0	3	4.1	8.3	2.5
	10.0	**6**	**8.8**	**10.8**	**8.6**
	15.0	2	9.7	10.8	8.8
(2) The Synthetic B_1 Crystals (Proposed new standard)	0.0010	3	6.0	10.3	5.3
	0.0015	3	7.8	10.0	7.0
	0.0020	**4**	**8.7**	**10.8**	**6.2**
	0.0025	5	9.5	7.5	9.5
	0.0030	1	13.2	8.0	16.0
(3) Oryzanin Crystals, the natural B_1 isolated from rice polishings	0.0010	3	5.0	10.3	1.5
	0.0015	3	7.0	11.7	4.0
	0.0020	**4**	**8.8**	**11.4**	**9.7**
	0.0025	4	9.2	9.8	6.0
	0.0030	2	10.5	11.5	9.5
(4) "Injectio Oryzanin Fortior" of Sankyo & Co.	0.003 cc (=0.0015 mg hydrochloride)	4	6.9	9.1	1.8
	0.004 cc (=0.002 mg hydrochloride)	**4**	**10.1**	**8.6**	**9.6**
	0.005 cc (=0.0025 mg hydrochloride)	2	10.4	13.0	6.3
	0.006 cc (=0.003 mg hydrochloride)	3	11.7	8.0	16.3

(Room temperature·····17~24°C)

(B) The curative "Day-dose" for pigeons.

The curative Day-dose was tested by the method of Kinnersley and Peters[1] and the results are summarised in the following table:–

(1) Kinnersley & Peters: Bioch. J. **19**, 820 (1925).

Table 3. Comparison of B_1 activity by the Day-dose.

Pigeon No.	Body-weight initial (g)	Days to B_1-deficiency	Body-weight at B_1-deficiency (g)	Dose (mg)	Days of cure	Day-dose (mg)
(1) The standard adsorption product (orally);						
1) 904	294	27	220	75.0	6	12.5
2) 918	335	11	267	75.0	6	12.5
3) 955	342	27	204	75.0	7	10.7
4) 956(2)	382	32	220	75.0	6	12.5
5) 906	305	32	208	50.0	7	7.2
6) 908(1)	285	22	192	50.0	4	12.5
7) 919	305	18	173	50.0	5	10.0
8) 956(1)	382	27	214	50.0	5	10.0
Average day dose						10.98
(2) The synthetic vitamin B_1 crystals (by injection.);						
1) 901	282	16	179	0.01	2.5	0.004
2) 916	310	28	205	0.01	6	0.0016
3) 908(2)	285	26	190	0.01	3	0.0033
4) 909(1)	325	19	216	0.01	5	0.002
5) 909(2)	325	24	169	0.01	3	0.0033
6) 915	312	18	207	0.01	4	0.0025
7) 920	290	28	198	0.01	5	0.002
8) 922	290	18	204	0.01	3	0.0033
9) 936	324	23	217	0.01	4	0.0025
10) 940(2)	300	24	225	0.01	4	0.0025
11) 933(1)	310	18	239	0.008	3	0.0026
12) 933(2)	310	21	220	0.008	3	0.0026
13) 907	310	36	169	0.008	3	0.0026
14) 927(1)	345	31	196	0.008	5	0.0016
15) 927(2)	345	36	160	0.008	5	0.0016
16) 929	320	19	252	0.008	2	0.004
17) 934	306	21	227	0.008	4	0.002
18) 936(1)	324	19	237	0.008	4	0.002
Average day dose						0.0026
(3) Oryzanin crystals, the natural B_1 (by injection);						
1) 911	330	19	269	0.01	5	0.002
2) 922(2)	290	21	192	0.01	4	0.0025
3) 948(2)	330	21	190	0.01	3	0.0033
4) 953	302	15	214	0.01	3	0.0033
5) 935(1)	308	16	229	0.009	5	0.0018
6) 935(2)	308	21	180	0.008	4	0.002
7) 945(1)	334	18	230	0.008	4	0.002
8) 945(2)	334	22	218	0.008	3	0.0026
9) 946	349	12	242	0.008	3.5	0.0023
0) 948(1)	330	17	218	0.008	4	0.002
Average day dose						0.0024
(4) "Injectio Oryzanin Fortior" of Sankyo & Co. (by injection);						
1) 954	320	22	218	0.02 cc (0.01 mg)	4	0.005 cc(0.0025 mg)
2) 951	358	32	208	0.02 cc (0.01 mg)	5	0.004 cc(0.002 mg)
3) 947	353	32	238	0.02 cc (0.01 mg)	5	0.004 cc(0.002 mg)
4) 944(1)	343	14	267	0.016 cc (0.008 mg)	3	0.0052 cc (0.0026 mg)
5) 944(2)	343	17	250	0.016 cc (0.008 mg)	3	0.0052 cc (0.0026 mg)
6) 952	300	17	234	0.016 cc (0.008 mg)	3	0.0052 cc (0.0026 mg)
7) 949	347	19	243	0.016 cc (0.008 mg)	3.5	0.0046 cc (0.0023 mg)
Average day dose						0.0048 cc (0.0024 mg)

From the above results, it was observed that the synthetic B_1 crystals possess nearly the same activity as the natural B_1 crystals isolated from rice polishings and 0.0023 mg of it is equivalent to the standard unit.

(C) The curative test for pigeons.

The curative daily dose was tested by the known technique on pigeons fed on the standard artificial diet, defieient in B_1, consisting of 60% of purified starch, 20% of purified casein, 15% of arachis oil, 5% of McCollums salt mixture No. 185, supplemented daily with 3 drops of cod liver oil and 0.4 g of autoclaved yeast, and the results were compared with that of the standard product.

(1) The standard adsorption product :– When pigeons were fed on the artificial diet mentioned above, they developed severe symptoms of B_1 deficiency usually in 4–5 weeks. By giving daily 20 mg of the adsorption product orally for a week, pigeons were cured completely in 1 day and the weight increased gradually to the last 7 th day, while daily doses of 10 mg or 15 mg were found to be insufficient. (Table 4. Chart 5)

(2) The synthetic B_1 crystals :– By the subcutaneous injection in a daily dose of 0.004 mg, pigeons suffering from B_1 deficiency were cured perfectly in a day and their weight increased gradually toward the end of the experiment. (Table 4. Chart 6)

(3) Oryzanin crystals: – Pigeons suffering from B_1 deficiency on the artificial diet mentioned above, were perfectly cured in a day by the subcutaneous injection in a daily dose of 0.004 mg and increased in weight to the last 7 th day. A daily dose of 0.005 mg gave still better results. (Table 4. Chart 7)

(4) Injectio Oryzanin Fortior :– The activity of the preparation was tested by injection in daily doses of 0.006 cc (=0.003 mg), 0.007 cc (=0.0035 mg), 0.008 cc (=0.004 mg) and 0.01 cc (=0.005 mg of the crystalline hydrochloride), respectively, on pigeons suffering from B_1 deficiency by feeding on the artificial diet, and 0.008 cc was proved to be the curative daily dose. (Table 4. Chart 8)

Table 4. B_1 activity by the curative test for pigeons.

Dose (mg)	Number of pigeons	Weight initial (g)	Days to B_1-deficiency	Weight at B_1-deficiency (g)	Cured in days	Weight last 7th day (g)	Days to B_1-deficiency	Weight at next B_1-deficiency (g)
(1) The standard adsorption product (by oral administration);								
10.0	3	362	26	247	not cured	232	2	213*
15.0	2	383	28	256	3 days	250	5	231
20.0	**1**	**373**	**27**	**260**	**1 ,,**	**280**	**7**	**246**
30.0	1	395	28	291	1/2 ,,	332	7	299
(2) The synthetic B_1 crystals (by injection);								
0.002	2	326	27	245	not cured, died after 5 days.			
0.0025	3	332	31	238	not cured	244	4	224*
0.003	3	376	35	309	1 day	285	2	282
0.0035	3	371	32	273	4 hrs.	289	2	270
0.004	**3**	**343**	**32**	**272**	**3 ,,**	**294**	**5**	**274**

(3) Oryzanin crystals, the natural B_1 (by injection);

0.0025	3	371	29	278	not cured	285	2	264*
0.0035	3	317	31	240	1/2 day	268	7	254
0.004	**2**	**376**	**32**	**280**	**3 hrs**	**298**	**3**	**273**
0.005	3	356	28	262	3 ,,	279	5	250

(4) "Injectio Oryzanin Fortior" of Sankyo & Co. (by injection);

0.006 cc (=0.003 mg, hydrochloride)	3	316	30	227	1 day	239	4	222
0.007 cc (=0.0035 mg, hydrochloride)	2	348	32	256	1/2 ,,	279	3	235
0.008 cc (=0.004 mg, hydrochloride)	**3**	**350**	**29**	**257**	**3 hrs**	**274**	**3**	**255**
0.01 cc (=0.005 mg, hydrochloride)	2	325	29	255	3 ,,	283	7	250

*.....died

Summary.

The above results are summarised in the following table;

Materials	Rat growth dose (mg)	Pigeon Day-dose (mg)	Pigeon curative dose (mg)	International standard unit (mg)
(1) The standard adsorption product	10.00	11.00	20.00	10.00
(2) The synthetic B_1 crystals	0.002	0.0026	0.004	0.002 (0.002−0.0024)
(3) Oryzanin, the natural B_1 crystals	0.002	0.0024	0.004	0.002 (0.002−0.0022)
(4) "Injectio Oryzanin Fortior" of Sankyo & Co.	0.004 cc (=0.002 mg hydrochloride)	0.0048 cc (=0.0024 mg hydrochloride)	0.008 cc (=0.004 mg hydrochloride)	0.004 cc (=0.002 mg hydrochloride)

In the comparison of B_1 activity, it is concluded that the synthetic B_1 crystals which was proposed as a new standard has the same activity as the crystalline Oryzanin isolated from rice-polishings and 0.002 mg is approximately equivalent to the standard unit. For more accurate value, another method for B_1 determination should be studied further.

The authors wish to express their sincere thanks to Prof. U. Suzuki for his kind advice and to Sankyo & Co. for the financial aid to this work. They are also indebted to Messrs. M. Kamada und T. Hayakawa for their kind help in the curative test.

(Tokyo, March 25th. 1938)

On the Soil Type in Manchuria.

Part I. The brown forest soil in north-eastern Manchuria.

(pp. 599~606)

By R. Kawashima.

(Agricultural Chemical Laboratory, the Kyushu Imperial University,

Received Apr. 7, 1938.)

I. Iyasaka brown forest soil.

Iyasaka is a village settled by Japanese in 1933 and is situated in lat. 46° 25′ N. and long. 130° 40′ E. The arable land is mostly a brown forest soil podzolized only a slight extent, and its parent material is principally sedimentary rocks of paleozoic formation. The data described under, are all expressed in dry basis except pH-value.

The clay fraction in fine soil below 2 mm in diameter is given in table I.

Table I. Clay content.

Layer	A_1	A_2	A_3	B_1	B_2
Thickness (cm)	16	16	12	16	40
Clay, <0.01 mm	48.40	48.68	49.97	55.30	56.70
Clay, <0.001 mm	12.90	12.46	15.85	17.43	14.99

As is seen in the table, there is observed some moving down of clay particles in the profile.

Some analytical data on fine soil are given in table II. The exchange capacity and exchangeable calcium are expressed as mg. eq. per 100 g.

Table II. Some analytical data on fine soil.

Layer	Loss on ignition %	Total N.	pH		Daikuhara acidity ($y_1 \times 3$)	Hydroly acidity (y_1)	Exchange capacity	Exchangeable Ca	% of Ca
			H_2O	KCl					
A_1	10.54	0.33	5.62	4.98	0.4	20.3	26.64	20.14	75.6
A_2	6.26	0.15	5.38	4.42	1.6	18.8	18.91	12.73	67.3
A_3	4.84	0.09	5.46	4.32	2.0	16.9	17.47	11.23	64.3
B_1	4.46	0.06	5.48	4.17	4.5	13.5	19.34	12.65	65.4
B_2	5.33	0.05	5.48	4.15	5.8	14.1	26.65	17.51	65.7

As in the table II, the pH-values of aqueous suspension and percentage saturation in calcium show a fair uniformity between each layers.

The colloidal clays (<0.001 mm ϕ) were separated and analysed. The total contents of silica and sesquioxides and their molecular ratios are given in table III. In addition, the loss on ignition and exchange capacity are added together.

Table III. Some analytical data on colloidal clay.

Layer	Loss on ignition %	Exchange capacity (m. eq.)	SiO_2 %	Al_2O_3 %	Fe_2O_3	$\frac{SiO_2}{Al_2O_3}$	$\frac{SiO_2}{R_2O_3}$	$\frac{Fe_2O_3}{Al_2O_3}$
A_1	23.60	76.39	38.69	16.44	7.70	3.99	3.07	0.30
A_2	15.69	63.06	45.84	19.40	8.70	4.01	3.11	0.29
A_3	14.63	60.76	46.73	19.71	9.23	4.02	3.09	0.30
B_1	11.49	56.70	46.38	22.85	10.10	3.59	2.80	0.28
B_2	11.56	58.60	48.44	20.72	10.67	3.96	2.98	0.33

The high loss on ignition and exchange capacity in A_1 are partly attributable on the presence of some humus. The silica-alumina ratio in B_1 is the smallest, and that means some accumulation of sesquioxides in this layer. But as the differences in the magnitude of SiO_2/Al_2O_3 and SiO_2/R_2O_3 between each layers are insignificant, there can be assumed a fairly good similarity of composition between these colloidal clays.

II. Neian brown forest soil.

Neian is situated about 309 km. southward of Iyasaka, and the parent material of this brown forest soil is basalt. The soils were treated quite similar with the Iyasaka soils, and the analytical results are given in the following tables.

Table I. Clay content.

Layer	Thickness cm	Clay. <0.01 mm %	Clay. <0.001 mm %
A	75	40.54	8.80
B_1	70	42.14	8.78

Table II. Some analytical data on fine soil.

Layer	Loss on ignition %	Total N %	PH		Daiku-hara acidity ($y_1 \times 3$)	Hydroly acidity (y_1)	Exchange capacity (m. eq.)	Exchange-able Ca (m. eq.)	% of Ca
			H_2O	KCl					
A	6.50	0.08	6.78	5.48	0.3	6.6	30.68	23.54	76.7
B_1	6.01	0.03	6.35	4.93	0.6	7.2	31.91	23.66	74.2

Table III. Some analytical data on colloidal clay.

Layer	Loss on ignition %	Exchange capacity (m. eq.)	SiO_2 %	Al_2O_2 %	Fe_2O_3 %	$\frac{SiO_2}{Al_2O_3}$	$\frac{SiO_2}{Al_2O_3}$	$\frac{Fe_2O_3}{Al_2O_3}$
A	11.62	62.51	48.15	21.70	10.59	3.76	2.87	0.31
B_1	10.45	60.50	48.47	21.24	10.50	3.87	2.94	0.32

The results in above three tables denote that there appear no signs of podzolization in this typically developed Neian brown forest soil. This soil is the same type as Prof. Stremme's brauner Gesteinswaldboden.

Fibre of Flowers of Typha Latifolia L.

(pp. 607～608)

By Yoshijiro KIHARA.

(Agricultural Chemical Laboratory, Tokyo Imperial University,

Received Mar. 31, 1938.)

The flowers of Typha latifolia L. is a fine smooth fibre having 0.007 mm of

width and 5 mm of the length.

The analysis of fibre was as follows;

Moisture	12.87%	Total soluble carbohydrate	23.38%
Total cellulose	41.45%	Alcohol-benzene extract	1.55%
α-cellulose	69.04%	Ether extactives	1.76%
β-cellulose	14.64%	Total N	0.92%
γ-cellulose	16.32%	Crude protein	5.75%
Pentose	22.11%	Ash	6.87%

The carbohydrate in the fibre consisted of a kind of hemicellulose which could not be extracted with various solvents.

It was hydrolyzed with dilute acid into arabinose. It was identified as benzylphenylhydrazin and phenylosazone. It showed no naphthoresorcin reaction.

When the fibre was digested with 8% NaOH at 160° for 6 hrs., a gray soft pulp was obtained.

The properties of the pulp were as follows;

α-cellulose	83.41	Ash	8.83
β-cellulose	5.64	Copper value (Brady's method)	0.07

It was easily bleached by the bleaching powder and did not give the lignin test.

Studies on the Mucilage from Rhodophyceae.

I. Isolation of the Mucilage from 3 Species of Chondrus.
II. The Chemical Nature of the Mucilage from Chondrus ocellatus Holmes.

(pp. 609～625)

By T. Mori and Y. Tutiya.

(Laboratory of Chemistry of Marine Products,
Tokyo Imperial University, Received Apr. 7, 1938.)

Chemical Studies on Japanese Coccidae. (XVIII).

Summary of the Reports I—XVII.

(pp. 626～633)

By M. Kawano and R. Maruyama.

(Laboratory of Ohsaka Factory of Sankyo Co. Ltd.,
Received Mar. 17, 1938.)

Untersuchungen über den Abbau von Acetoin durch Mikroben. (3).

Über den Abbau-Mechanismus von Acetoin.

(ss. 634～641)

Von Yukio Tomiyasu.

(Aus dem Agrikulturchemischen Institut der Kaiserlichen Kyushu-Universität,
Eingegangen am 31. 3, 1938.)

Untersuhungen über den Mechanismus von Acetoin-Abbau durch *Bacillus lactis aerogenes* führten zu folgenden Ergebnissen.

Als Abbauprodukt wurde nur Essigsäure festgestellt. Äthylalkohol sowie Acetaldehyd wurden nicht nachgewiesen. Es wurde weiter bestätigt, dass Äthylalkohol sowie Acetaldehyd durch die ruhenden Bakterien ziemlich schnell verbraucht werden, dagegen nicht die Essigsäure. Als Bildungsweise der Essigsäure aus Acetoin kamen zunächst folgende zwei Möglichkeiten in Betracht:

$$CH_3CHOH\cdot CO\cdot CH_3 + O_2 \rightarrow 2CH_3COOH \quad \cdots\cdots (1)$$

$$CH_3CHOH\cdot CO\cdot CH_3 + H_2O \rightarrow CH_3COOH + CH_3CH_2OH \quad \cdots\cdots (2)$$

Es ist klar geworden, dass der Acetoin-Abbau mit dem reinen oxydativen Vorgang nichts zu tun hat, 1. weil der Sauerstoff ohne Einfluss auf den Abbau ist, d.h. der Abbau findet auch glatt im streng anaerobenen Zustand statt, 2. weil die Ausbeute des Abbauproduktes zu gering ist. Die Ausbeute an Essigsäure beträgt nach Formel (1) berechnet nur etwa 35% der Theorie, dagegen etwa 70% nach Formel (2). Was die Ursache der geringeren Ausbeute anbelangt, so ergeben sich aus den verschiedenartig angestellten Versuchen folgende Antworten:

Die Ausbeute der Säure wird um so grösser, je kürzer die Kulturdauer ist; die Bakterien atmen das Acetoin sehr leicht; der Acetoin-Abbau wird durch ein Antiseptikum stark verhindert.

Diese Ergebnisse führten mich zu der Schlussfolgerung, dass das Acetoin in der üblichen Kultur am Anfang hauptsächlich nach Formel (3) aerobisch verzehrt wird, solange genügend Sauerstoff im Medium vorhanden ist; und sodann wenn der Sauerstoff spärlich geworden ist, wird das Acetoin nach Formel (2) fermentativ abgebaut. In der Zwischenperiode beider Stadien finden zweierlei, im bestimmten Verhältnis zueinander stehende Abbauvorgänge statt.

$$CH_3CHOH\cdot CO\cdot CH_3 + 5O_2 \rightarrow 4CO_2 + 4H_2O \quad \cdots\cdots (3)$$

Untersuchungen über den Abbau von Acetoin durch Mikroben. (4).

Eine Klassifikation der Bakterien der Coli-Aerogenes Gruppe, unter Berücksichtigung ihrer Fähigkeit des Auf-und Abbaues von Acetoin.

(ss. 642～644)

Von Yukio Tomiyasu

(Aus dem Agrikulturchemischen Institut der Kaiserlichen Kyushu-Universität,

Eingegangen am 31, 3, 1938.)

In beiden vorstehenden Arbeiten habe ich mitgeteilt, dass nur einige Bakterienstämme der Acetoin-produzierenden Aerogenes-Gruppe die Abbau-Fähigkeit des Acetoins besitzen, dass dagegen den Nicht-Acetoinbildnern (Coli-Gruppe) überhaupt diese Fähigkeit fehlt. Um diese Tatsache sicher festzustellen, wurden 297 Bakterienstämme der Coli-Aerogenes Gruppe zu den Versuchen verwendet, wovon 266 Stämme von neuem aus verschiedenen Materialien nach der Vorschrift von Bergey (Manual of Determinative Bacteriology, 1930) isoliert wurden. (Tabelle 1)

Tabelle 1.

Material		Nr. d. Materialien.	Nr. d. isolierten Bakterienstämme.	
			Aerogenes-Gruppe	Coli-Gruppe
Menschen	Kot	84	38	139
Rinder		12	1	19
Pferde		4	3	9
Hunde		6	0	6
Kaninchen		18	2	19
Ratten		10	0	14
Boden		16	4	12
		Total	48	218

Das Ergebnis der Versuche war wie folgt. (Tabelle 2)

Tabelle 2.

Probe	Reaktion	Nr. d. Bakterienstämme	
		Aerogenes-Gruppe	Coli-Gruppe
Acetoin-Aufbau	positiv	51	0
	negativ	0	246
Acetoin-Abbau	positiv	15	0
	negativ	36	246
Methylrot	positiv	0	246
	negativ	51	0
Citrat	positiv	50	5
	negativ	1	241
Cellobiose	positiv	49	30
	negativ	2	236

Aus der Tabelle ist ersichtlich, dass die Bakterien der Coli-Gruppe überhaupt keine Auf- und Abbau-Fähigkeit besitzen, während einige von den Bakterien der Aerogenes-Gruppe beide Fähigkeiten, und andere nur die Abbau-Fähigkeit besitzen. Somit dürfte man die Bakterien der Aerogenes-Gruppe auf Grund ihrer Abbau-Fähigkeit von Acetoin noch weiter in zwei Arten klassifizieren, so dass man die Bakterien der Coli-Aerogenes Gruppe nach dem Verhalten gegen Acetoin in folgende drei Arten klassifizieren können wird.

Tabelle 3.

Bakterien	Aufbau-Fähigkeit	Abbau-Fähigkeit	Nr. d. verwendeten Stämme
Aerogenes A (Abbau-Typen)	+	+	15
„ B (Unabbau-Typen)	+	−	36
Coli	−	−	246